State of North Carolina's

Recommendation on Boundaries

for 8-Hour Ozone

Nonattainment Areas

June 29, 2000
Governor James B. Hunt, Jr.

Summary of Recommendation

The State of North Carolina's recommendations for the nonattaiment designation for the 8-hour ozone standard is reflected in the attached map entitled, "Recommendation to U.S. EPA on 8-hour Ozone Nonattainment Designations Consistent with Adoption and Implementation of the Governor's Clean Air Plan" (Map 1). The recommendation includes full county designation for Alamance, Cabarrus, Catawba, Cumberland, Davidson, Durham, Forsyth, Gaston, Guilford, Harnett, Lincoln, Mecklenburg, Orange, Randolph, Rowan, Union, and Wake Counties, and partial county designations for Alexander, Buncombe, Burke, Caldwell, Caswell, Chatham, Davie, Duplin, Edgecombe, Franklin, Granville, Haywood, Iredell, Jackson, Johnston, Lenoir, McDowell, Northampton, Person, Pitt, Rockingham, Swain, and Yancey Counties. Additionally, North Carolina suggests that York County, South Carolina be considered for nonattainment as well.

In the spring of 1999, 14 public meetings were held across the State where a range of three designation options were presented (see attached maps). Option A was based on designating the urban area boundary portion in each Metropolitan Statistical Area (MSA) in which a violating monitor existed, plus any additional areas around violating monitors in MSA and non-MSA counties. Option B represented full county designation for the 1-hour ozone maintenance areas, the metropolitan area boundaries in the MSA counties with violating monitors and any monitor locations outside of the metropolitan area boundaries. Option C represented full county designations of entire MSA violating the standard, non-MSA counties with violating monitors (Caswell, Granville, Haywood, and Lenoir) and counties believed to contribute to the ozone problem (Harnett, Iredell, Wayne and Wilson).

This designation recommendation takes into consideration comments received during the 14 public meetings. These comments included population, commuting patterns and monitoring data (see map entitled "North Carolina Counties with 8-Hour Ozone Violations 1997-1999"). The rationale for the designations was that in the core urban areas whole counties were selected. In the less urbanized areas where the population and vehicle miles traveled are somewhat low, yet the monitoring data shows violations of the 8-hour ozone standard, partial counties were selected. In most instances, the partial county designations were represented by city or township boundaries. In the mountain areas (Buncombe, Haywood, Jackson, McDowell, Swain and Yancey Counties), the North Carolina portion of the Great Smokey Mountain National Park, and elevations above 4000 feet in the Great Balsams, Plott Balsams, and Black Mountains and a portion of the Blue Ridge are being recommended for designation. This is due to the violations occurring only at high elevations in these areas. The full discussion of the partial county designations, including a discussion on the mountain area designations, is attached. In addition, attached is a letter from the U.S. Park Service supporting the nonattainment designation recommendations.

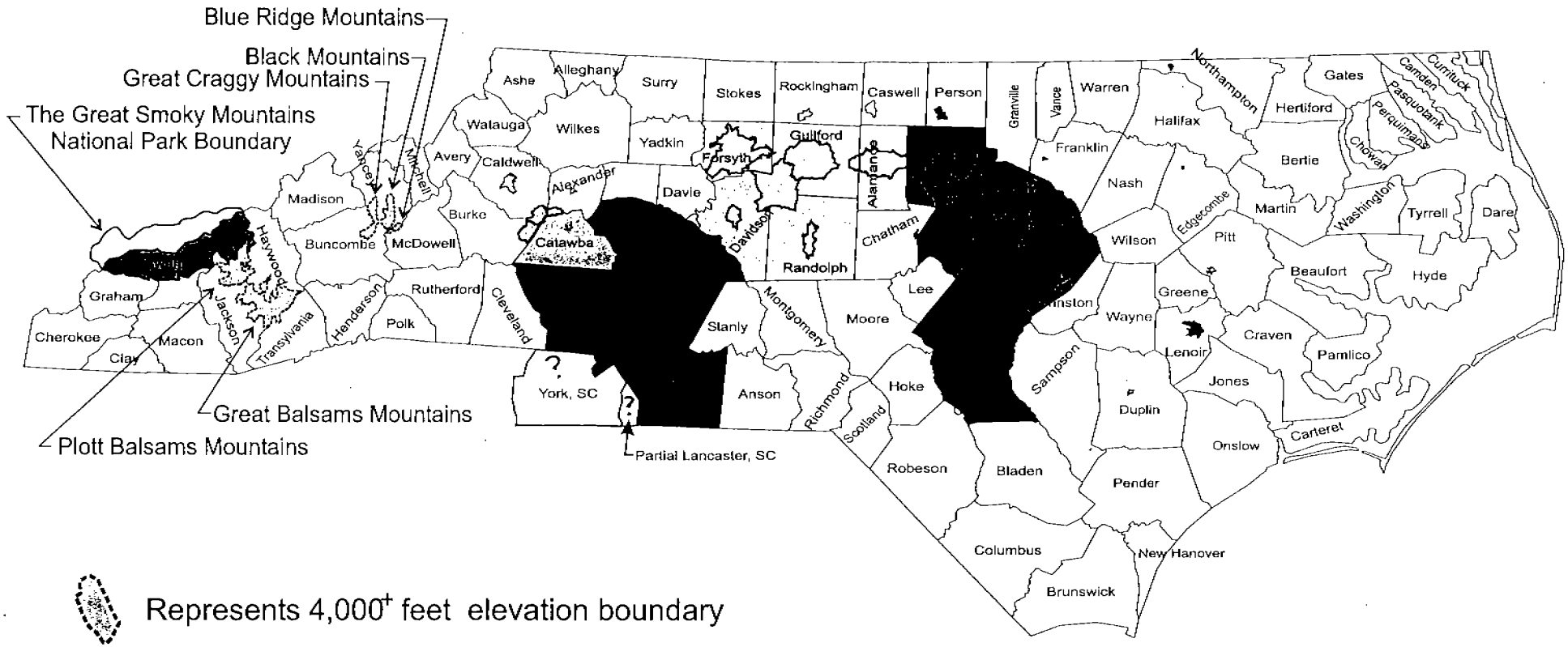
These designation recommendations address the designation area boundaries criteria laid out in the March 28, 2000 memo from John Seitz, Director of EPA Office of Air Quality Planning and Standards entitled, "Boundary Guidance on Air Quality Designations for the 8-Hour Ozone National Ambient Air Quality Standards (NAAQS or Standard)". An important consideration is that North Carolina has the legal authority to regulate emission sources in any area of the State irrespective of Federal designation status.

North Carolina is in the process of a modeling analysis to conclude what control strategies are necessary to address the 8-hour violations in the State. This modeling analysis will be completed by July 2001, with rule adoption to begin at that time. Clean air legislation was passed in the 1999 session of the General Assembly. This legislation requires the expansion of the vehicle inspection

and maintenance program to 48 counties and requires that the test be changed to On-Board Diagnostics system check, which addresses NOx emissions. The legislation also requires implementation of low sulfur fuel in 2004, and sets goals for AFV fleets, telecommuting for state employees, and reduction of the VMT growth rate. This legislation, combined with the additional strategies identified in the modeling analysis will ensure compliance with the 8-hour ozone standard.

Finally, North Carolina implements an extensive ozone action day program in four areas, the Greater Charlotte area, Triad, Triangle and Asheville. This program warns citizens of upcoming ozone events so that the public can better protect their health, and take action to reduce their own emission producing activities. This program will be expanded to Fayetteville and Hickory next year, with other areas to be added in the future.

Map 1
North Carolina's Recommendations to US-EPA on 8-hour Ozone Nonattainment Designations Consistent with Adoption and Implementation of the Governor's Clean Air Plan



Reductions in emissions will be required in areas as needed, even in areas not designated nonattainment, as part of the Governor's Clean Air Plan and as allowed by State Statutes.

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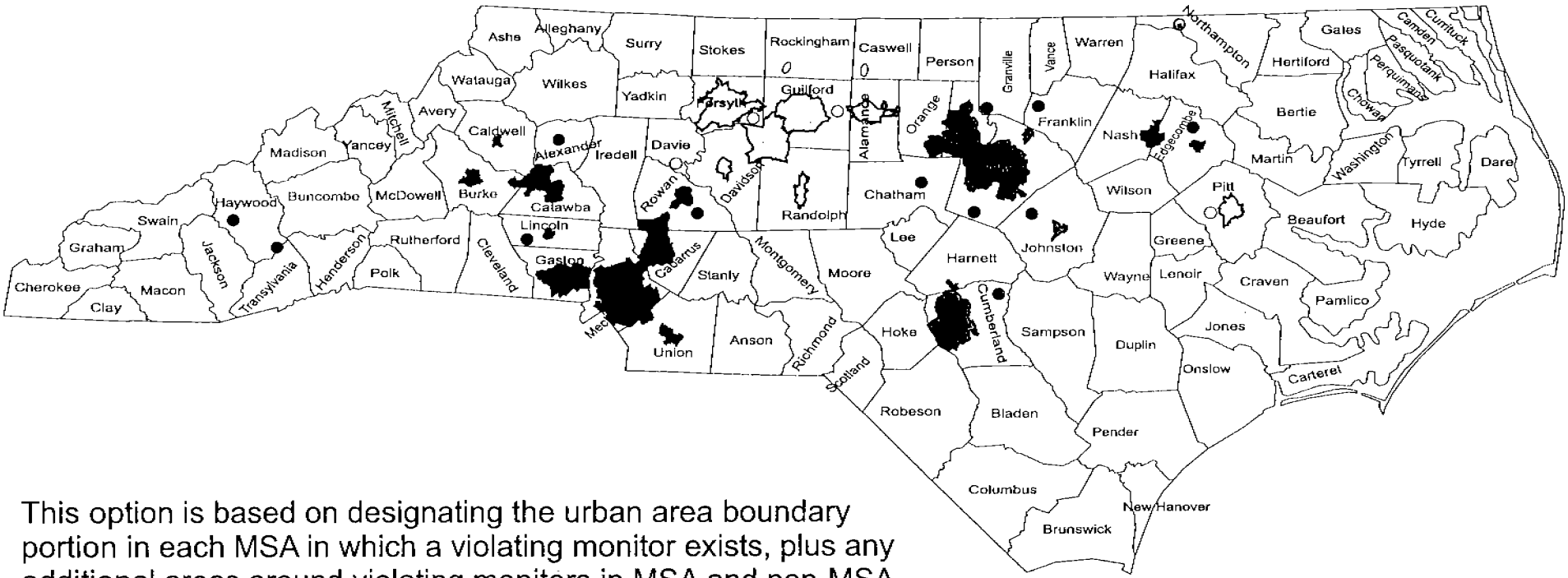
Option A: Recommendations on 8-hour Ozone Nonattainment Designations



This option is based on designating the urban area boundary portion in each MSA in which a violating monitor exists, plus any additional areas around violating monitors in MSA and non-MSA counties

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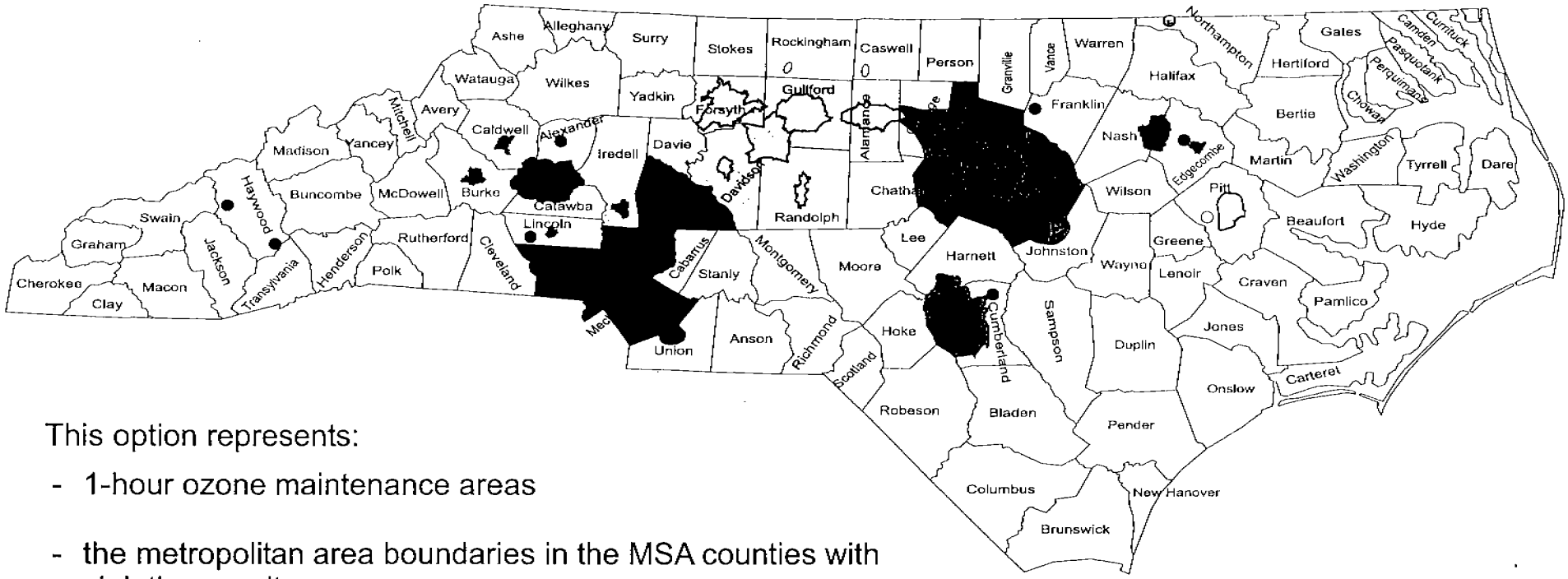
Option B: Recommendations on 8-hour Ozone Nonattainment Designations



This option represents:

- 1-hour ozone maintenance areas
- the metropolitan area boundaries in the MSA counties with violating monitors
- any monitor locations outside of the metropolitan area boundaries

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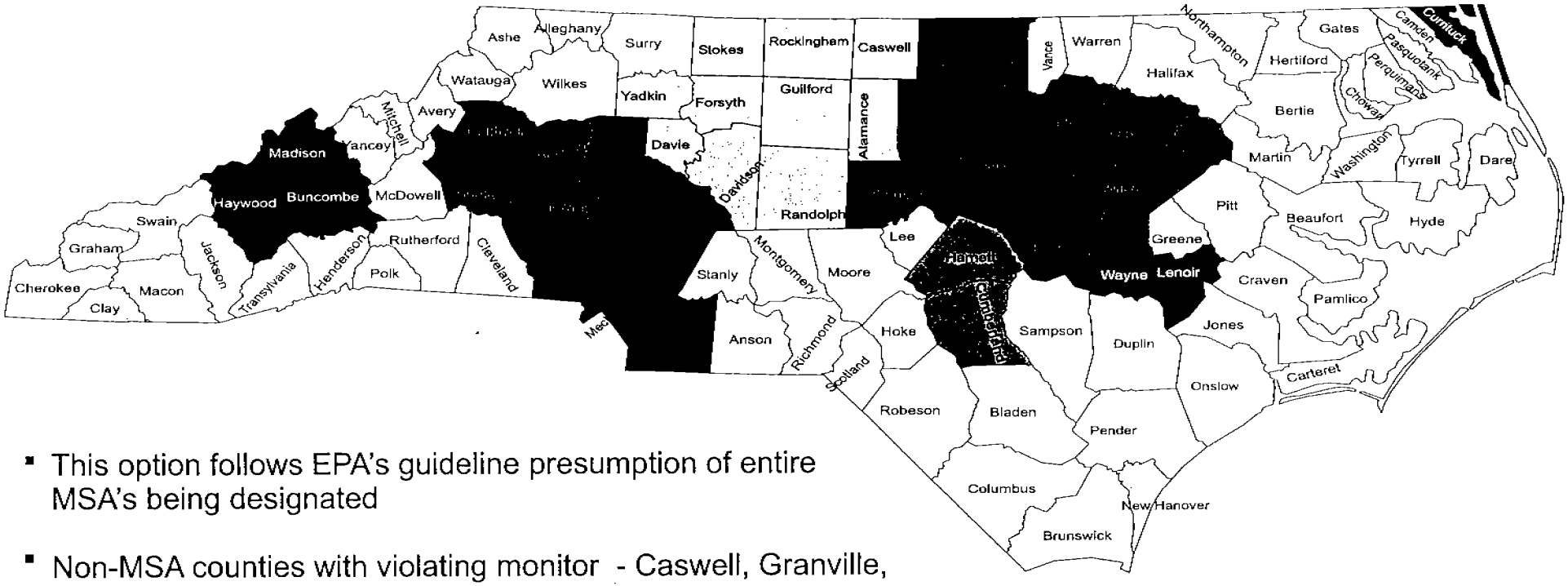
Option C: Recommendations on 8-hour Ozone Nonattainment Designations



- This option follows EPA's guideline presumption of entire MSA's being designated
- Non-MSA counties with violating monitor - Caswell, Granville, Haywood, Lenoir
- Counties believed to contribute to problem - Harnett, Iredell, Wayne, Wilson

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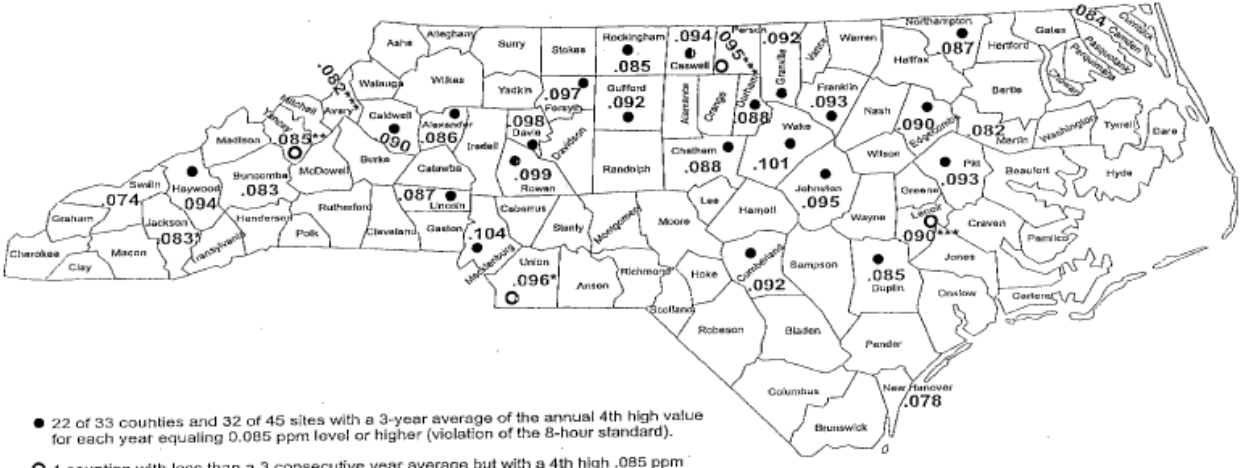
North Carolina Counties with 8-Hour Ozone Violations 1997-1999



- 22 of 33 counties and 32 of 45 sites with a 3-year average of the annual 4th high value for each year equaling 0.085 ppm level or higher (violation of the 8-hour standard).
- O 4 counties with less than a 3 consecutive year average but with a 4th high .085 ppm or higher.

NOTE:
- *Additional counties may be involved in emission reduction strategies*
- *Nonattainment designations may not follow county boundaries*
- *Data currently undergoing final review*

* Based on calendar year 1999, which is not suitable for attainment determination (not 3 consecutive years).
** Based on calendar years 1996, 1997 and 1999.
*** Based on calendar years 1998 and 1999.

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North Carolina's Recommendations on Boundaries for 8-hour Ozone Nonattainment Areas

Purpose: The purpose of this documentation is to address the criteria EPA established for considering boundaries less than the full MSA for designation. This document only covers areas where the recommendation is less than the full MSA, or where additional areas beyond the MSA are recommended for nonattainment designation.

Charlotte/Gastonia/Rock Hill Area

- Iredell County -This is not an MSA county, and it does not have a monitor located in the County. This is a high commuter county into the Charlotte area along the I-77 corridor. The northern portion of the county is rural, so the recommendation is for a smaller area than the entire county.
- The recommendation is for the southern portion of Iredell County, south of I-40.
- 113,000 people in Iredell County
- 4,274,700 VMT
- Emissions: Iredell County has 37.66 tons per day of NOx (state total is 2516 tons per day) and the county has 25.62 tons per day of VOC (state total is 1756 tons per day).
- Northern portion of County has low population density, with 1 tract falling in the 0-50 people per square mile category and 1 tract containing 50-100 people per square mile. The portion that is recommended to be designated nonattainment has 6 tracts with 100-250 people per square mile, 1 tract with 250-500 people per square mile, and about 7 small tracts with 500-1500 people per square mile.
- There is some emission sources in the county, including a natural gas pumping station.
- Growth Expected: The population in Iredell County is expected to grow between 2000 and 2007, with a total increase of 8.7%.
- Meteorology – Winds across Iredell County are climatologically from the southwest. With this climatological wind pattern, the emissions in the southern part of the county will likely impact the Triad area. On days when the winds are from the north, the emissions will add to the Charlotte area's pollution.
- Level of control of emissions sources: Currently there are few major point sources in Iredell County to control. The majority of the NOx emissions are from mobile sources (21.13 tons of the 37.66 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide. An I/M program will begin in Iredell County on July 1, 2003.
- Regional Emissions Reductions: Duke Energy's Marshall facility located in neighboring Catawba County is one of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Greensboro/Winston-Salem/High Point Area

- Caswell – The recommendation is for the following area where the monitor is located: From Highway 150 follow Camp Springs Road south to Cherry Grove Road, then head east to Pagetown Road (south) to Moore Road (east) to Stadler Road (north) to Cherry Grove Road (east) to Wagon Wheel Road (north) to 150 (west) back to Camp Springs Road. This is not an MSA county, but it does have a monitor located in the Cherry Grove community. This is a very rural county and is measuring ozone levels generated in the Triad area, so the recommendation is for a smaller area than the entire county.
- 23,000 people in Caswell County
- 564,000 VMT
- Emissions: Caswell County has 2.39 tons per day of NOx (state total is 2516 tons per day) and the county has 3.01 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with 4 tracts falling in the 0-50 people per square mile and 2 tracts containing 50-100 people per square mile.
- There are very few emission sources in the county.
- The county does not appear on the list of high commuting counties into the Triad urban area.
- Growth Expected: The population in Caswell County is expected to decrease between 2000 and 2007, with a total reduction of 0.4%.
- Meteorology – Winds across Caswell County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of North Carolina. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triad. As the pollution in the Triad area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Cherry Grove monitor is 0.094ppm.
- Level of control of emissions sources: Currently there are no major point sources in Caswell County to control. The majority of the NOx emissions are from mobile sources (1.58 tons of the 2.39 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions: Duke Energy's Belews Creek facility located 2 counties over in Stokes County, and CP&L's Roxboro and Mayo units located in neighboring Person County are three of Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Greensboro/Winston-Salem/High Point Area

- Stokes – This is an MSA county, but there is no monitor located here. This is a rural county, so the recommendation is that no portion of the county be designated nonattainment.

- 44,000 people in Stokes County
- 907,000 VMT
- Emissions: Stokes County has 340.24 tons per day of NOx (state total is 2516 tons per day) and the county has 5.86 tons per day of VOC (state total is 1756 tons per day).
- Most of the County has low population density, with 3 tracts falling in the 0-50 people per square mile, 2 tracts containing 50-100 people per square mile, 1 tract with 100-250 people per square mile, and 1 tract with 250-500 people per square mile. The two most populated tracts are in the southern portion and are adjacent to Forsyth County.
- There is one large emission source in the county, Duke Energy's Belews Creek power plant, which is located in the southeastern corner of the county.
- Growth Expected: Stokes County is expected to grow 8% in population between 2000 and 2007.
- Meteorology – Winds across Stokes County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of the MSA or North Carolina. The exception is in the case of northerly winds.
- Level of control of emissions sources: Currently there is one major point source in Stokes County to control and this facility has been proposed for additional control under the upcoming utility regulations. The remaining NOx emissions are from mobile sources (2.36 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Stokes County will have an I/M program beginning in July 2005. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions: Duke Energy's Belews Creek facility is one of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Greensboro/Winston-Salem/High Point Area

- Yadkin – Suggest leaving Yadkin County in attainment, even though it is an MSA county. This is a rural county, and the primary emission sources are already being addressed in Federal and State initiatives.
- 36,000 people in Yadkin County
- 1,272,900 VMT
- Emissions: Yadkin County has 6.80 tons per day of NOx (state total is 2516 tons per day) and the county has 6.76 tons per day of VOC (state total is 1756 tons per day).
- Entire County has fairly low population density, with 3 tracts falling in the 50-100 people per square mile and 2 tracts containing 100-250 people per square mile.
- There are very few emission sources in the county.
- Growth Expected: Yadkin County's population is expected to grow by 6.8% between 2000 and 2007.
- Meteorology – Winds across Yadkin County are climatologically from the southwest. With this climatological wind pattern, the majority of the county is not in an upwind

sector that would routinely have an impact on air quality in the urban portion of the MSA.

- Level of control of emissions sources: Currently there are no major point sources in Yadkin County to control. The majority of the NOx emissions are from mobile sources (5.37 tons of the 6.80 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions: Duke Energy's Belews Creek facility located 1 county to the northeast in Stokes County is one of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Greensboro/Winston-Salem/High Point Area

- Davie –Recommend the same area that was nonattainment under the 1-hour standard be designated nonattainment under the 8-hour standard, specifically, the area bounded by the Yadkin River, Dutchman's Creek, NC Highway 801, Fulton Creek and back to the Yadkin River. This is a rural MSA county, and the primary emission sources are already being addressed in Federal and State initiatives. There is a monitor located in the southeastern corner of the county and it is in violation of the 8-hour standard.
- 32,000 people in Davie County
- 1,181,400 VMT
- Emissions: Davie County has 7.34 tons per day of NOx (state total is 2516 tons per day) and the county has 9.55 tons per day of VOC (state total is 1756 tons per day).
- Entire County has fairly low population density, with 2 tracts falling in the 50-100 people per square mile and 5 tracts containing 100-250 people per square mile.
- There are very few emission sources in the county.
- Growth Expected –Davie County is expected to gain 5.9% in population growth from 2000 to 2007.
- Meteorology - Winds across Davie County are climatologically from the southwest. With this climatological wind pattern, the northwestern portion of the county is not in an upwind sector that would routinely have an impact on air quality in the urban portion of the MSA.
- Level of control of emissions sources: Currently there are no major point sources in Davie County to control. The majority of the NOx emissions are from mobile sources (5.94 tons of the 7.34 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions: Duke Energy's Belews Creek facility and Marshall facilities located 2 counties away are two of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.

- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Greensboro/Winston-Salem/High Point Area

- Rockingham County - This is not an MSA county, but it does have a monitor located in the County. This is a fairly rural county, so the recommendation is for the following area: From Highway 65, head south on Hayes Road to Troublesome Creek, follow the creek northeast to Witty Road, north to Brown Road, northeast to Iron Works Road, west to Highway 65, north to New Lebanon Church Road, southwest to Huffine Mill Road, west to Bethany Road, south to Barham Road, west to Kallam Mill Road, south to Angell Road, south to Highway 65, west to Haynes Road.
- 90,000 people in Rockingham County
- 2,468,400 VMT
- Emissions: Rockingham County has 41.71 tons per day of NOx (state total is 2516 tons per day) and the county has 19.41 tons per day of VOC (state total is 1756 tons per day). The majority of the county's NOx emissions come from point sources (31.02 tons per day). The largest sources in the county are Duke Energy's Dan River power plant averaging 14 tons per day of NOx in 1995, and Transcontinental Gas Pipeline pumping station averaging 15 tons per day of NOx in 1995. Both of these sources are targeted for control under the NOx SIP call, and will be evaluated in North Carolina's 8-hour attainment strategy.
- Entire County has fairly low population density, with the majority of the county area located in census tracts falling in the 50-100 and the 100-250 people per square mile.
- There are few emission sources in the county.
- Growth Expected –Rockingham County is expected to experience a 1% population growth between 2000 and 2007.
- Meteorology – Winds across Rockingham County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of North Carolina or any area of Virginia. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triad. As the pollution in the Triad area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Rockingham County (Bethany) monitor is 0.085ppm.
- Level of control of emissions sources: The 8-hour modeling analysis will evaluate the effectiveness of controls on the point sources in Rockingham County. Duke Energy's Dan River facility is located in Rockingham County, with emissions around 14 tons per day. There is a natural gas pumping station in the county as well. The other large source category of NOx emissions is mobile sources (7.04 tons per day), and the combined Federal and state control programs will address these emissions. The inspection and maintenance program will begin in Rockingham County on July 1, 2004. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions: Duke Energy's Belews Creek facility located in neighboring Stokes County, and CP&L's Roxboro and Mayo units located 2 counties

away in Person County are three of Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.

- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under attainment strategy, regardless of designation.

Raleigh/Durham/Chapel Hill Area

- Person County - This is not an MSA county, but it does have a monitor located in the County. This is a rural county, so the recommendation is for a smaller area than the entire county.
- The recommendation is for the following area where the monitor is located: from Highway 49 head south on Jim Morton Road, then east on Briggs Road, then south on Whitfield Road, then east on Union Grove Church Road, then north on Highway 157, then northwest on Poindexter Road, then west on Hassell Horton Road, northeast on Highway 49, then northwest on Paynes Tavern Road, then southwest on Hester's Store Road, then south on Robert Hester Road, then northeast on Highway 149 back to Jim Morton Road.
- 34,000 people in Person County
- 711,900 VMT
- Emissions: Person County has 256.33 tons per day of NOx (state total is 2516 tons per day) and the county has 6.99 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 or the 50-100 people per square mile.
- There are two large emission sources in the county, CP&L's Roxboro and Mayo units.
- Growth Expected –Population in Person County is expected to grow by 3.4% between 2000 and 2007.
- Meteorology - Winds across Person County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of North Carolina. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triangle. As the pollution in the Triangle area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Person County (Bushy Fork) monitor is 0.095 ppm (2 years of data – 1998 and 1999).
- Level of control of emissions sources: Currently there are two major NOx point sources in Person County to control and there are proposed rules underway – see discussion below. The remaining NOx emissions are from mobile sources (6.83 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - CP&L's Roxboro and Mayo units located in Person County are two of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.

- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Raleigh/Durham/Chapel Hill Area

- Granville County - This is not an MSA county, but it does have a monitor located in the County. This is a fairly rural county, so the recommendation is for a smaller area than the entire county.
- The recommendation is for the Dutchville Township where the Butner monitor is located.
- 44,000 people in Granville County
- 1,482,000 VMT
- Emissions: Granville County has 8.93 tons per day of NOx (state total is 2516 tons per day) and the county has 9.80 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 or the 50-100 people per square mile.
- There are very few emission sources in the county.
- The county does appear on the list of high commuting counties into the Triangle urban area (third highest rate into Durham County, behind Wake and Orange).
- Growth Expected --Population in Granville County is expected to grow by 6.7% between 2000 and 2007.
- Meteorology - Winds across Granville County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of North Carolina. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triangle. As the pollution in the Triangle area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Granville County (Butner) monitor is 0.095 ppm.
- Level of control of emissions sources: Currently there are no major NOx point sources in Granville County to control. The majority of the NOx emissions are from mobile sources (6.83 tons of the 8.93 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. The inspection and maintenance program will begin in Granville County on July 1, 2004. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - CP&L's Roxboro and Mayo units located in neighboring Person County are two of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Raleigh/Durham/Chapel Hill Area

- Franklin County - This is an MSA county, with a monitor in the southern portion of the county. This monitor is in violation of the 8-hour standard. This is a fairly rural county,

so the recommendation is for only the southern portion of the county, a smaller area than the entire county.

- The recommendation is for the municipal boundary of Franklinton, where the monitor is located.
- 45,000 people in Franklin County
- 1,117,000 VMT
- Emissions: Franklin County has 5.67 tons per day of NOx (state total is 2516 tons per day) and the county has 6.66 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 or the 50-100 people per square mile.
- There are very few emission sources in the county.
- Growth Expected – Franklin County's population is expected to grow by 12.1% between 2000 and 2007.
- Meteorology – Winds across Franklin County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in the urban portion of the MSA. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triangle. As the pollution in the Triangle area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Franklinton monitor is 0.093ppm.
- Level of control of emissions sources: Currently there are no major NOx point sources in Franklin County to control. The majority of the NOx emissions are from mobile sources (3.21 tons of the 5.67 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. The inspection and maintenance program will begin in Franklin County on January 1, 2004. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - CP&L's Roxboro and Mayo units located 2 counties away in Person County are two of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Raleigh/Durham/Chapel Hill Area

- Johnston County - This is an MSA county, with a monitor in the western portion of the county. This monitor is in violation of the 8-hour standard. This is a fairly rural county, so the recommendation is for only the western portion of the county (west of I-95), a smaller area than the entire county.
- The recommendation is for the western portion of the county that covers both the monitor site, and the expansion of the housing developments from the Raleigh urban area.
- 109,000 people in Johnston County
- 4,316,800 VMT
- Emissions: Johnston County has 27.15 tons per day of NOx (state total is 2516 tons per

day) and the county has 24.02 tons per day of VOC (state total is 1756 tons per day).

- Entire County has low population density, with the majority of the county falling in the 50-100 or 100-250 people per square mile.
- There are very few emission sources in the county.
- The county does appear on the list of high commuting counties into the Triangle urban area (highest rate into Wake County).
- Growth Expected – Johnston County's population is expected to grow by 12.4% between 2000 and 2007.
- Meteorology – Winds across Johnston County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in the urban portion of the MSA. On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triangle. As the pollution in the Triangle area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the west Johnston monitor is 0.095ppm.
- Level of control of emissions sources: Currently there are no major NOx point sources in Johnston County to control. The majority of the NOx emissions are from mobile sources (19.06 tons of the 27.15 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. The inspection and maintenance program will begin in Johnston County on July 1, 2003. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions – North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Raleigh/Durham/Chapel Hill Area

- Chatham County - This is an MSA county, with a monitor that is violating the 8-hour standard. This is a fairly rural county, so the recommendation is for a smaller area than the entire county.
- The recommendation is for the eastern portion of the county (east of Highway 15-501, and including the municipal boundary of Pittsboro).
- 47,000 people in Chatham County
- 1,437,900 VMT
- Emissions: Chatham County has 25.66 tons per day of NOx (state total is 2516 tons per day) and the county has 10.29 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 or the 50-100 people per square mile.
- There are very few emission sources in the county, though there is one large facility, CP&L's Cape Fear power plant in eastern Chatham County.
- The county does appear on the list of high commuting counties into the Triangle urban

area (seventh highest rate into Durham County).

- Growth Expected - Chatham County's expected population growth between 2000 and 2007 is 8.1%.
- Meteorology – Winds across Chatham County are climatologically from the southwest. With this climatological wind pattern, the county will have some impact on the Triangle's air quality. The monitor routinely measures the plume from the Triangle when the winds are from the north and northeast. Currently, the design value for the Chatham County (Pittsboro) monitor is 0.088 ppm.
- Level of control of emissions sources: Currently there is one major NOx point source in Chatham County to control. This facility is located in the eastern part of the county. This source would be evaluated for needed control as part of the 8-hour attainment demonstration (Phase III of the Governor's Clean Air Plan). The majority of the remaining NOx emissions are from mobile sources (4.02 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. The inspection and maintenance program will begin in Chatham County on January 1, 2004. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - CP&L's Roxboro and Mayo units located in nearby Person County are two of the Big 5 utility sources proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Northampton County

- This site is not part of an MSA, nor adjacent to an MSA. This is a very rural county, so the recommendation is for a smaller area than the entire county. The site appears to be impacted by transport from nearby urban areas such as the Triangle and Norfolk. The design value is currently .087 ppm, which is just over the standard.
- The recommendation is for the municipal boundary of Gaston, where the monitor site is located.
- 21,000 people in Northampton County
- 860,000 VMT
- Emissions: Northampton County has 6.22 tons per day of NOx (state total is 2516 tons per day) and the county has 4.48 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 people per square mile category.
- There are very few emission sources in the county.
- The county does not appear on the list of high commuting counties into any of the nearby MSA counties.
- Growth Expected – Northampton County's population is expected to decrease by 3.7% between 2000 and 2007.
- Meteorology – Winds across Northampton County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector

that would routinely have an impact on air quality in any portion of North Carolina. Given the small amount of NOx emissions, Northampton County is also unlikely to impact Virginia. On the days when the monitor exceeds the 8-hour standard, it appears to be primarily measuring the urban plume or pollution from the Triangle. On a few of the exceedence days, the monitor appears to be measuring the urban plumes from Richmond and Norfolk. As the pollution in the Triangle area is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Northampton County (Gaston) monitor is 0.087 ppm.

- Level of control of emissions sources: Currently there are no major NOx point sources in Northampton County to control. The majority of the NOx emissions are from mobile sources (3.78 tons of the 6.22 tons come from mobile sources each day), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Norfolk/Virginia Beach/Newport News Area

- Currituck County is part of the MSA, but the recommendation is for none of this county be designated nonattainment. This is a very rural and remote county. There is no monitoring site in the county, but neighboring Camden County does have a monitoring site that is attaining the 8-hour ozone standard. Virginia DEQ has indicated that they do not believe Currituck County should be part of the Norfolk nonattainment area.
- 17,000 people in Currituck County
- 587,000 VMT
- Emissions: Currituck County has 4.49 tons per day of NOx (state total is 2516 tons per day) and the county has 8.31 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 50-100 people per square mile category.
- There are no point sources in the county.
- Growth Expected – Currituck County's population is expected to grow by 11.8% between 2000 and 2007.
- Meteorology - Winds across Currituck County are climatologically from the southwest. With this climatological wind pattern, the county is not in an upwind sector that would routinely have an impact on air quality in any portion of North Carolina.
- Level of control of emissions sources: Currently there are no major NOx point sources in Currituck County to control. The majority of the NOx emissions are from mobile sources (2.25 tons of the 4.49 tons come from mobile sources each day, with another 2.18 tons per day coming from non-road engines such as motor boats), and the combined Federal

and state control programs will address these mobile emissions. Low sulfur gasoline will be required statewide.

- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Duplin County

- This site is not part of an MSA, but it is adjacent to Goldsboro MSA (Wayne County). However, there are no monitors in Wayne County. Duplin is a very rural county, so the recommendation is for a smaller area than the entire county. The site appears to be impacted by transport from nearby urban areas such as the Triangle and Fayetteville.
- The recommendation is for the municipal boundary of Kenansville, where the monitor site is located.
- 45,000 people in Duplin County
- 1,695,000 VMT
- Emissions: Duplin County has 11.56 tons per day of NOx (state total is 2516 tons per day) and the county has 11.57 tons per day of VOC (state total is 1756 tons per day).
- Entire County has low population density, with the majority of the county falling in the 0-50 people per square mile category.
- There are very few emission sources in the county.
- Growth Expected – Population in Duplin County is expected to grow by 2.7% between 2000 and 2007.
- Meteorology – On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from two primary source regions, the Triangle and Fayetteville. As the pollution in these two regions is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Duplin County (Kenansville) monitor is 0.085ppm.
- Level of control of emissions sources: Currently there are few major NOx point sources in Duplin County to control, but these sources will be evaluated as part of the 8-hour ozone strategy.. The majority of the NOx emissions are from mobile and nonroad sources (5.73 tons of the 11.56 tons come from mobile sources each day, and an additional 3.58 tons per day come from nonroad engines), and the combined Federal and state control programs will address these emissions. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Lenoir County

- This site is not part of an MSA, but it is adjacent to Goldsboro MSA (Wayne County). However, there are no monitors in Wayne County. Lenoir is a fairly rural county, so the recommendation is for a smaller area than the entire county. The site appears to be impacted by transport from nearby urban areas such as the Triangle and Fayetteville.
- The recommendation is for the municipal boundary of Kinston, where the monitor site is located.
- 59,000 people in Lenoir County
- 1,521,000 VMT
- Emissions: Lenoir County has 11.11 tons per day of NOx (state total is 2516 tons per day) and the county has 15.25 tons per day of VOC (state total is 1756 tons per day).
- Entire County has fairly low population density, with the majority of the county falling in the 100-250 people per square mile category.
- There are very few emission sources in the county.
- Growth Expected – The population in Lenoir County is expected to decrease by 0.7% between 2000 and 2007.
- Meteorology – On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from two primary source regions, the Triangle and Fayetteville. As the pollution in these two regions is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Lenoir County (Lenoir Community College) monitor is 0.090 ppm (2 years of data – 1998 and 1999).
- Level of control of emissions sources: Currently there are few major NOx point sources in Lenoir County to control, but these sources will be evaluated as part of the 8-hour ozone strategy.. The majority of the NOx emissions are from mobile and nonroad sources (4.76 tons of the 11.11 tons come from mobile sources each day, and an additional 3.47 tons per day come from nonroad engines), and the combined Federal and state control programs will address these emissions. An I/M program will begin in Lenoir County on January 1, 2005. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Pitt County

- This site is part of an MSA, but the majority of the emissions from the MSA are to the east of the monitor and our wind analysis has shown that on no days when the monitor exceeded the 8-hour standard, did the emissions come from the east. The site appears to be impacted by transport from nearby urban areas such as the Triangle and Fayetteville. The monitor located in Martin County, which is considered an indicator monitor for the Greeneville urban area, is still measuring attainment.

- The recommendation is for the municipal boundary of Farmville, where the monitor site is located.
- 125,000 people in Pitt County
- 2,757,100 VMT
- Emissions: Pitt County has 15.19 tons per day of NOx (state total is 2516 tons per day) and the county has 20.72 tons per day of VOC (state total is 1756 tons per day).
- There are very few emission sources in the county.
- Growth Expected – Population in Pitt County is expected to grow by 10.6% between 2000 and 2007.
- Meteorology – On the days when the monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from two primary source regions, the Triangle and Fayetteville. As the pollution in these two regions is reduced, the monitor should observe lower ozone levels. Currently, the design value for the Farmville monitor is 0.093ppm.
- Level of control of emissions sources: Currently there are few major NOx point sources in Pitt County to control, but these sources will be evaluated as part of the 8-hour ozone strategy. The majority of the NOx emissions are from mobile and nonroad sources (7.76 tons of the 15.19 tons come from mobile sources each day, and an additional 6.80 tons per day come from nonroad engines), and the combined Federal and state control programs will address these emissions. The I/M program will be implemented in Pitt County beginning in January 2005. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Edgecombe County

- This site is part of an MSA, but the emissions from the MSA are about one third of the Wake County emissions alone, not to mention the rest of the emissions in the Triangle. Our wind analysis has shown that on days when the monitor exceeded the 8-hour standard, the plume from the Triangle impacts this areas. Therefore, our recommendation is for a smaller area than the MSA since the nearby Triangle MSA appears to have a significant impact on air quality in this area. Additionally, the majority of emissions in the MSA are from mobile sources. These sources will be addressed as part of the Federal and state strategy. Finally, the monitor is measuring .090 ppm, and as emissions are reduced in the Triangle, we will see improvement in this area.
- The recommendation is for the municipal boundary of Leggett, where the monitor site is located.
- 55,000 people in Edgecombe County, 89,000 people in Nash County
- 1,434,600 VMT in Edgecombe, 3,415,000 in Nash County
- Emissions: Edgecombe County has 14.80 tons per day of NOx (state total is 2516 tons

per day) and the county has 9.83 tons per day of VOC (state total is 1756 tons per day). Nash County has 20.27 tons per day of NOx (state total is 2516 tons per day) and the county has 17.15 tons per day of VOC (state total is 1756 tons per day).

- There are very a few emission sources in the counties and these sources will be evaluated for additional control under the 8-hour attainment strategy.
- Growth Expected – Edgecombe County's population is expected to decrease by 0.5% between 2000 and 2007, while Nash County's population is expected to 8.1% over the same time period.
- Meteorology - On the days when this monitor exceeds the 8-hour standard, it appears to be measuring the urban plume or pollution from the Triangle. As the pollution in the Triangle area is reduced, this monitor should observe lower ozone levels. Currently, it is measuring at .090 ppm.
- Level of control of emissions sources: The majority of the emissions are generated from mobile sources and both of these counties will be implementing an inspection and maintenance program. The other Federal and state mobile strategies will also reduce these emissions. The I/M program will be implemented in both Nash and Edgecombe Counties by January 2005. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Hickory/Morganton MSA

- There are two sites located in this MSA, one in Lenoir in Caldwell County and one in Taylorsville in Alexander County. Both sites have marginal violations (.090 at the Lenoir site and .086 at the Taylorsville site). A wind analysis suggests that these sites are impacted by transport from the west and northwest, and that pollution comes over the mountains and mixes down into the valleys where the monitors are located. There are also a number of days when both Charlotte and the Triad are having impacts on these sites. For these reasons, we recommend a smaller area than the full MSA
- The recommendation is for the municipal boundary of Taylorsville, the municipal boundary of Lenoir, the portion of the Hickory MPO boundary in Caldwell, Burke and Alexander counties, and all of Catawba County.
- 137,000 people in Catawba County, 85,000 people in Burke County, 76,000 in Caldwell County and 32,000 in Alexander County
- 3,763,800 VMT in Catawba, 2,369,300 in Burke County, 611,200 in Alexander County, and 1,726,900 in Caldwell County
- Emissions: Catawba County has 194.35 tons per day of NOx (state total is 2516 tons per day) and the county has 60.84 tons per day of VOC (state total is 1756 tons per day). Caldwell County has 8.43 tons per day of NOx and the county has 37.18 tons per day of VOC. Burke County has 13.92 tons per day of NOx and the county has 27.04 tons per

day of VOC. Alexander County has 3.48 tons per day of NOx and the county has 7.30 tons per day of VOC.

- There are emission sources in the counties and these sources will be evaluated for additional control under the 8-hour attainment strategy.
- Growth Expected – Alexander County's expected population growth is 6.7% between 2000 and 2007, while Burke County's is 4.1%, Caldwell County's is 2.0%, and Catawba County's is 5.7%.
- Meteorology - On the days when this monitor exceeds the 8-hour standard, it appears to be measuring pollution from several other areas, including Tennessee, the Ohio River Valley, Charlotte and the Triad. As the pollution in these areas is reduced, these monitors should observe lower ozone levels. Currently, the design value for the Lenoir monitor is 0.090ppm and the Taylorsville monitor is 0.086ppm.
- Level of control of emissions sources: The majority of the emissions are generated from mobile sources and three of these counties will be implementing an inspection and maintenance program. The other Federal and state mobile strategies will also reduce these emissions. The I/M program begins in Catawba County in July 2003, and in Caldwell and Burke Counties in July 2005. Low sulfur gasoline will be required statewide.
- Regional Emissions Reductions - North Carolina is currently in a rulemaking process to require controls on 5 of the largest utility sources in the state. Duke Energy's Marshall Steam Station located in southeastern Catawba County is one of these units. The units are proposed to be controlled to .15 lb NO_x/mmBTU level, with an alternative control level of the whole system of power plants being controlled to .25 lb NOx/mmBTU. The rules will go to public hearing in July 2000.
- DENR's ability to control sources throughout the state: Statute allows sources anywhere in the state to be controlled under an attainment strategy, regardless of designation.

Mountain Sites -

Recommended boundary: Great Smoky Mountains National Park (entire area regardless of elevation), and the Great Balsams, Plott Balsams, Great Craggy Mountains, Blue Ridge Mountains and Black Mountains above 4000 feet in ranges where violating monitors are located. This represents the area observing 8-hour violations, since the nearby valley sites are attaining the standard. Additionally, the exceedances are occurring in the middle of the night, rather than in the afternoon. This timing of the exceedances is indicative of transport and not local generation of ozone, since the ozone chemisty stops once the sun goes down. The areas where the violations are occurring are very sparsely populated and the emissions densities are low compared to urban areas of North Carolina. The trajectories of air parcels suggest most pollution is being transported to the mountain sites from Georgia, Tennessee, and the Ohio Valley. North Carolina will carefully analyze strategies expected to be implemented in these areas and work closely with these states in the SAMI process to define any additional controls to reduce the pollution in the mountains.

United States Department of the Interior

NATIONAL PARK SERVICE
Southeast Regional Office
Atlanta Federal Center
1924 Building
100 Alabama St., S.W.
Atlanta, Georgia 30303

IN REPLY REFER TO:

May 25, 2000

Mr. Brock Nicholson
North Carolina Department of Environment and Natural Resources
Air Quality Division
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

Dear Mr. Nicholson:

This is in follow up to the recent conference call between our agencies concerning the State's upcoming designation of ozone nonattainment areas in North Carolina. As you know, the National Park Service (NPS) is concerned about the restoration and protection of air resources in Great Smoky Mountains National Park (NP), which includes the park's attainment of the ozone national ambient air quality standard (NAAQS). Therefore, we are very interested in how ozone nonattainment area boundaries can be defined for the park. We desire nonattainment boundaries that will result in emission control measures and programs that will be effective in putting the park on the path to cleaner air and compliance with ozone NAAQS. We have similar concerns for other park areas in North Carolina and the surrounding region, such as the Blue Ridge Parkway and Shenandoah NP. In addition, if ozone nonattainment designations for park units in North Carolina will not achieve our clean air objectives, we then believe other possible state regulatory approaches may be necessary.

As discussed, Great Smoky Mountains NP is a mandatory federal Class I area administered by the NPS and lies in western North Carolina and eastern Tennessee. The park experiences impacts from emission sources in both States, as well as from transported emissions from outside these states. Although Class I areas are afforded special protection under the Clean Air Act, Great Smoky Mountains NP and other park units in the region (e.g., Blue Ridge Parkway, Shenandoah NP, and Mammoth Cave NP) still experience significant air pollution problems. Ambient ozone monitoring data from Great Smoky Mountains NP demonstrate that air quality continues to deteriorate due to the cumulative effects of existing and new emissions of ozone precursors (i.e., nitrogen oxides (NO_x) and volatile organic compounds (VOCs)). Recent monitoring in the park indicates an increasing frequency and magnitude of violations of the 8-hour ozone NAAQS in the park on both sides of state lines, despite ongoing state, regional, and national pollution reduction efforts. In fact, with the exception of one national park in California, Great Smoky Mountains NP has the worst monitored ozone air quality in the National Park System.

During the 1997-1999 period, Tennessee ambient ozone monitoring data show that Great Smoky Mountains NP was exposed to ozone levels among the highest in the state. In 1998 and 1999, the park recorded 44 and 52 days, respectively, when the maximum daily 8-hour ozone average exceeded 85 parts per billion. Because these high ozone levels pose substantial health and safety threats to park visitors and staff, the park now issues ozone advisories to alert visitors and staff of these unhealthy ozone conditions. High ozone levels are also adversely impacting park vegetation by causing visible foliar injury and growth loss. There are 60 species of plants showing foliar symptoms consistent with ozone exposure, with an additional 30 species of plants in the park showing visible leaf damage at levels substantially lower than the 8-hour ozone NAAQS. There is also evidence of growth reductions on black cherry and yellow poplar, which are species also found at Blue Ridge Parkway, Shenandoah NP, and other federal, state and private forest areas in the region.

A summary of ozone data from sites in the park and in western North Carolina near the park for the 1997-1999 period is enclosed. These data show seven monitoring sites in the area of the park (including Haywood County, North Carolina) and the Blue Ridge Parkway that are in violation of the 8-hour ozone standard and four other sites with values between 80 and 85 parts per billion (ppb), just under the NAAQS, but higher than the level of the State's ambient standard of 80 ppb. To date, the park's monitoring sites exhibit among the highest levels of ambient ozone in either North Carolina or Tennessee, but there have been violations of the standard at the monitoring station in Lenoir (and Morganton, not shown on the enclosed chart) east of the park. Other low elevation sites in western North Carolina indicate ozone concentrations approaching the national standard as well.

It is apparent that the ozone problem appears to be widespread in the two-state area encompassing the park. The extensive violations in the seven county area associated with the Knoxville, TN metropolitan statistical area, which is adjacent to the park's western boundary, and the data from western North Carolina (including park data) support this view. For this reason, NPS believes any nonattainment designation for the park should be as large as necessary to include existing emission sources (and potential emissions growth areas) that contribute to violations of the ozone NAAQS at any receptor.

The use of other appropriate regulatory tools may be necessary when dealing with ozone impacts in rural areas, such as Great Smoky Mountains NP and the Blue Ridge Parkway, due to the transboundary nature of the ozone problem. Rural areas often do not contain the major emission sources that are largely responsible for the violations of the ozone ambient standard. As such, we concur with North Carolina's concern for mobile source emissions growth in several counties near Asheville, just outside the park, and are encouraged by the possibility that inspection and maintenance programs may be established in the near future to mitigate mobile emissions. Also, the application of regulatory tools to existing and new stationary sources of ozone precursor emissions in potential growth areas could also be used as part of a comprehensive control strategy to help mitigate additional excess emissions that contribute to this regional problem. For example, we recommend that the State consider requiring new major sources to use Lowest Achievable Emissions Rate technology and to obtain emissions offsets to help mitigate potential impacts. Or alternatively, if North Carolina defines ozone

nonattainment areas which do not include existing source and growth areas adjacent to the affected park units, the NPS would be interested in reaching an agreement with the State on how new source review and other regulatory mechanism can be used to address this issue.

We appreciate your efforts to offer the NPS this opportunity to provide relevant information and express our concerns about the protection of the air resources in Great Smoky Mountains NP and the Blue Ridge Parkway. The NPS is supportive of a designation of ozone nonattainment for all park units in North Carolina, if it will result in control strategies and compliance measures locally and in the broader region. We encourage the State to assure that the designation of nonattainment boundaries, which include parklands, results in effective and equitable implementation of control requirements to all contributing sources. The NPS does not want to be unfairly burdened with more stringent nonattainment area compliance requirements inside park units than would apply to other more emission-intensive activities outside the park units.

We look forward to working with your office on this matter. If you have any questions, please contact Jim Renfro of Great Smoky Mountains NP at 865-436-1708, Bambi Teague of Blue Ridge Parkway at 704-271-4779, or Brian Mitchell of the NPS Air Resources Division in Denver at 303-969-2819.

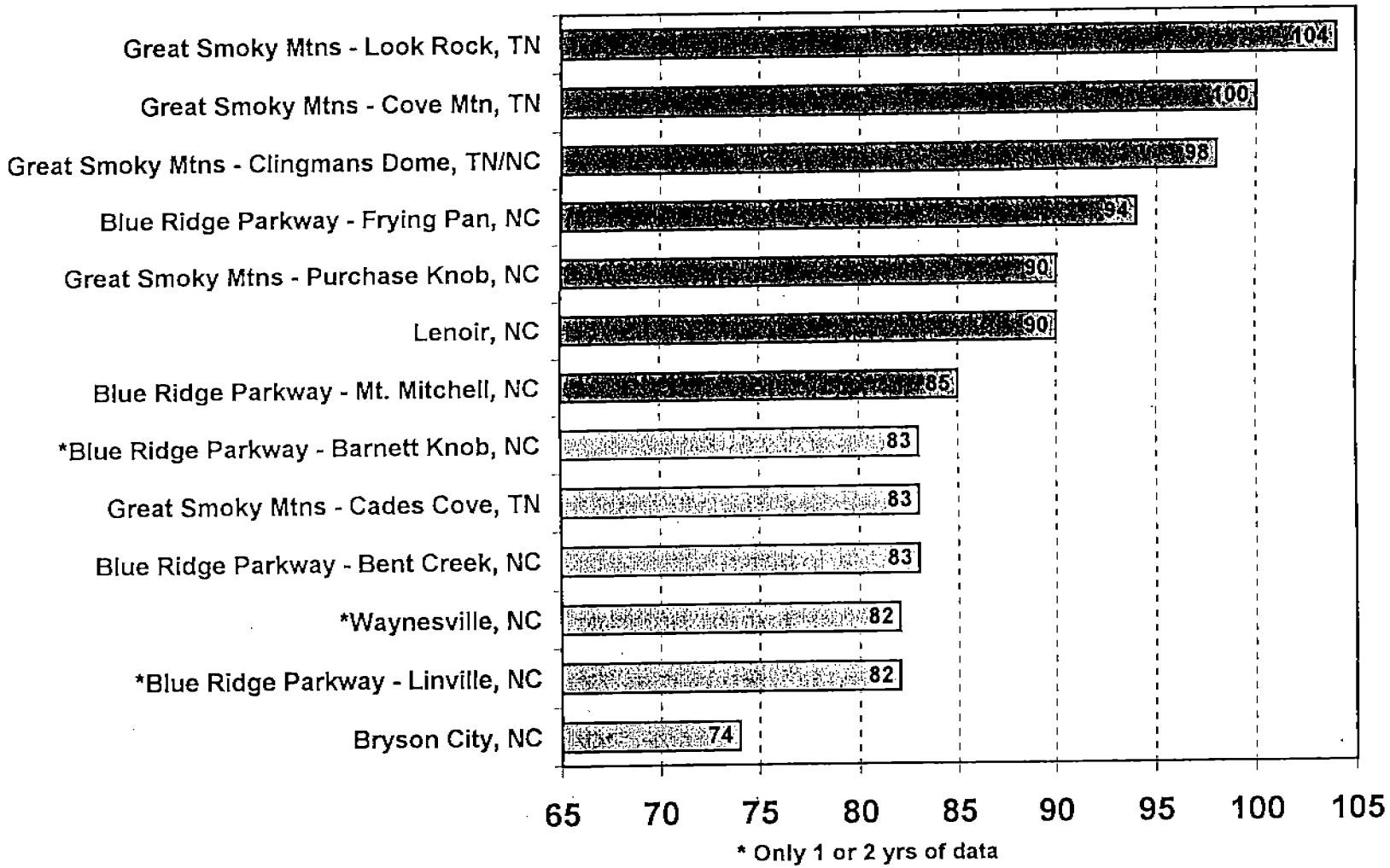
Sincerely,

for Regional Director,
Southeast Regional Office

Enclosure

Bcc:
Environmental Protection Agency – Region 4
SERO: O'Neal
GRSM: Supt., JRenfro
BLRI: Supt., BTeague
SHEN: Supt., CGordon
ARD-DEN: Mitchell, Ray, Bunyak, Scruggs, Shaver
Project & Reading File:Bmitchell:x2819:5/22/00:NC-OZONEnonattainment.doc

1997-1999 Average of the 4th Highest 8-hr Average Ozone Concentration (PPB) at Sites in Western North Carolina and Great Smoky Mountains National Park



March 28, 2000

MEMORANDUM

SUBJECT: Boundary Guidance on Air Quality Designations for the 8-Hour Ozone National Ambient Air Quality Standards (NAAQS or Standard)

FROM: John S. Seitz, Director
Office of Air Quality Planning and Standards (MD-10)

TO: Air Directors, Regions I-X

The purpose of this memorandum is to provide guidance to State and local air pollution control agencies and Tribes (States and Tribes) on designating areas as attainment/unclassifiable[1] or nonattainment and the Environmental Protection Agency's (EPA's) views on the boundaries for nonattainment areas for the 8-hour ground-level ozone NAAQS.

Area designations to attainment/unclassifiable or nonattainment are required after promulgation of a new or revised NAAQS. The EPA promulgated a new 8-hour ozone NAAQS in July 1997 and is, therefore, obligated to designate all areas by July 2000 as established by the Clean Air Act (CAA or Act) and the Transportation Equity Act for the 21 Century (TEA-21).[2] On May 14, 1999, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision remanding, but not vacating, the 8-hour ozone standard. The court noted that EPA is required to designate areas for any new or revised NAAQS in accordance with §107(d)(1) of the Act. American Trucking Assoc. v. EPA, 175 F.3d 1027, 1047-48, on rehearing 195 F.3d 4 (D.C. Cir. 1999).

The process for designations following promulgation of a NAAQS is contained in §107(d)(1) of the Act. This section provides each State Governor an opportunity to recommend attainment/unclassifiable or nonattainment designations including appropriate boundaries to EPA and for EPA to make modifications to these designations and boundaries as it deems necessary. In June 1999, EPA requested that each State forward (or complete entering into the Aerometric Information Retrieval System data base) air quality data through 1998 and identify which monitors were exceeding the 8-hour standard during the 1996-1998 time frame. The EPA is now requesting that each State Governor submit their designation recommendations and supporting

[1]A designation to attainment/unclassifiable means that the area has sufficient data to determine that the area is meeting the 8-hour ozone NAAQS or that due to no data or insufficient data, EPA cannot make a determination.

[2]CAA §107(d)(1); TEA-21§6103(a).

documentation to the appropriate EPA Regional Office, to the attention of the Regional Administrator, by June 30, 2000. These recommendations should generally be based on States' 1997-1999 quality-assured, Federal reference or equivalent air quality monitoring data.

In accordance with the CAA, EPA will review the recommended designations and may make modifications as deemed necessary to a State's recommendation. If EPA determines that a modification to the recommendation is necessary, EPA will notify the State no later than 120 days prior to promulgating a designation, which will provide an opportunity for the State to demonstrate why EPA's modification is not appropriate. In the case where a State does not submit recommendations, EPA will promulgate the designation it deems appropriate. As described in the attachment, Tribal designation activities are covered under a different legal authority.

This memorandum provides EPA's current views on how boundaries should be determined for designations. This guidance is not binding on States, Tribes, the public, or EPA. Issues concerning nonattainment area boundaries will be addressed in actions to designate nonattainment and attainment/unclassifiable areas under §107 of the CAA. When EPA promulgates designations, those determinations will be binding on States, Tribes, the public, and EPA as a matter of law.

The attachment contains the guidance on determining boundaries. Questions on this guidance may be directed to Sharon Reinders at 919-541-5284. The Regional Offices should make this guidance available to their States and Tribes and, where appropriate, work closely with them to ensure they submit their area recommendations by June 30, 2000.

Attachment

cc: Deputy Regional Administrators, Regions I-X
Margo Oge, OTAQ

Attachment

8-HOUR OZONE NAAQS
GUIDANCE ON NONATTAINMENT DESIGNATIONS

1. Why is EPA issuing this guidance on 8-hour ozone NAAQS nonattainment designations?

States have requested that EPA provide guidance on the appropriate boundaries for areas that will be designated nonattainment for the 8-hour standard. The EPA provided initial guidance on designations in a June 1999 memorandum.[1] That memorandum noted that EPA would provide additional information on designations at a future date. This guidance on how to determine the appropriate boundaries for areas that will be designated nonattainment for the current 8-hour ozone NAAQS is intended to meet that commitment. In addition, in light of the court decision remanding the 8-hour standard to EPA, States have asked what the implications are if EPA issues a revised ozone standard in response to the court's remand.

On July 18, 1997, EPA issued the revised NAAQS for ozone (62 FR 38856). The new standard is 0.08 parts per million (ppm) averaged over 8-hours; this compares to the pre-existing NAAQS of 0.12 ppm averaged over 1 hour. This action triggered the requirement under §107 of the Act and §6103 of TEA-21 for EPA to designate areas as attainment/unclassifiable or nonattainment for the revised NAAQS. Under these statutory provisions, EPA is required to designate areas for the revised standard by July 2000.

On May 14, 1999, the U.S. Court of Appeals for the District of Columbia Circuit issued a decision remanding, but not vacating, the 8-hour ozone standard. The court noted that EPA is required to designate areas for any new or revised NAAQS in accordance with §107(d)(1) of the Act. American Trucking Assoc. v. EPA, 175 F.3d 1027, 1047-48, on rehearing 195 F.3d 4 (D.C. Cir. 1999).

As provided in this guidance, EPA is planning to designate areas for the 8-hour ozone NAAQS promulgated in July 1997. If EPA promulgates a revised ozone NAAQS in response to a final unappealable court decision regarding the validity of the 8-hour standard, EPA would then be required to begin the designation process under §107 of the CAA for that revised ozone NAAQS. In such a case, EPA would issue guidance regarding designations for that revised NAAQS. At the time of promulgation of that revised NAAQS, EPA would establish, after an opportunity for public review, an appropriate transition scheme from the current 8-hour NAAQS to any revised NAAQS promulgated in response to the court's decision. Although this memorandum is not establishing the transition scheme, EPA does not anticipate requiring States or Tribes to comply with the statutory redesignation requirements to modify the designations for the replaced NAAQS.

2. What are the underlying requirements for designating areas for the 8-hour ozone NAAQS?

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[1]Memorandum of June 25, 1999, from John S. Seitz, "Designations for the 8-Hour Ozone National Ambient Air Quality Standard."

There are two relevant statutory provisions governing designations for the 8-hour ozone NAAQS. Section 107(d)(1) of the Act establishes the requirements for making designations for areas when a NAAQS is promulgated or revised. These are designations of nonattainment or attainment/unclassifiable. The provision provides an opportunity for each State to make a recommendation to EPA concerning the designation of areas in the State within 1 year after promulgation of a new or revised NAAQS. The EPA is required to designate areas across the country no later than 2 years following the promulgation of the NAAQS. The TEA-21 §6103 essentially extends by 1 year the 2-year designation process. Thus, States were provided 2 years to make their recommendations and EPA is required to designate areas 1 year after the State designation recommendations are due.

As authorized by the Tribal Authority Rule (TAR), Tribes may request an opportunity to submit designation recommendations to EPA. In cases where Tribes do not make their own recommendations, then EPA, in consultation with the Tribes, will promulgate the designation it deems appropriate on their behalf.[2]

In issuing the final designations, EPA is authorized to make such modifications it deems necessary to the recommended designations of the areas or portions thereof including the

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[2]The CAA, §301(d), authorizes EPA to treat eligible Indian Tribes in the same manner as States. Pursuant to §301(d)(2), EPA promulgated regulations known as the "Tribal Authority Rule" on February 12, 1999 that specifies those provisions of the Act for which it is appropriate to treat Tribes as States. 63 FR 7254, codified at 40 Code of Federal Regulations (CFR) §49 (1999). Under the TAR, Tribes may choose to develop and implement their own CAA programs, but are not required to do so. The TAR also establishes procedures and criteria by which Tribes may request from EPA a determination of eligibility for such treatment. The designations process contained in §107(d)(1) of the Act is included among those provisions determined appropriate by EPA for treatment of Tribes in the same manner as States. Therefore, EPA Regional Offices will work with the Tribes in their Regions that request an opportunity to submit designation recommendations. Eligible Tribes may choose to submit their own recommendations and supporting documentation. Since, currently, there is a lack of air quality monitoring data nationally throughout Indian country, the factors identified in this guidance should be considered in recommending designations for the 8-hour ozone standard. The EPA will review the recommendations made by Tribes and may, in consultation with the Tribes, make modifications as deemed necessary. Under the TAR, Tribes generally are not subject to the same submission schedules imposed by the CAA on States. Therefore, EPA Regional Offices will work with their Tribes in scheduling interim activities and final designation actions, insofar as practicable, within the time frames outlined in this memorandum.

Finally, certain aspects of this guidance may not be particularly suited for application to Tribes due to circumstances that presently exist throughout Indian country. Consequently, EPA intends to issue additional guidance in the near future to further address designation issues pertaining to Tribes.

boundaries of the areas or portions thereof. If EPA modifies a designation or boundary, it must notify the State or Tribe at least 120 days in advance of such action in order to give the State or Tribe an opportunity to demonstrate why the proposed modification is inappropriate. The EPA's designation of areas for the 8-hour ozone NAAQS will be based on the most recent 3 consecutive years of air quality data from Federal reference or equivalent method monitors.[3]

Tribes are not required to recommend designations; however, they may choose to make recommended designations for land under their jurisdiction. The EPA will review the Tribe's recommendation, and may, in consultation with the Tribe, make modifications to the Tribe's recommendation. In cases where Tribes do not make their own recommendations, then EPA, upon consultation with the respective Tribe(s), will make designations for them.

3. How should boundaries of nonattainment areas be drawn and what process must be followed?

Section 107(d)(1) of the CAA addresses the determination of whether an area is to be designated nonattainment. With respect to a specific NAAQS, such as the 8-hour ozone NAAQS, this provision requires all areas to be designated nonattainment if they do not meet the standard or contribute to ambient air quality in a nearby area that does not meet the standard.

The EPA believes that any county with an ozone monitor showing a violation of the NAAQS and any nearby contributing area needs to be designated as nonattainment. In reducing ozone concentrations above the NAAQS, EPA believes it is best to consider controls on sources over a larger area due to the pervasive nature of ground level ozone and transport of ozone and its precursors. Thus, EPA recommends that the Metropolitan Statistical Area or the Consolidated Metropolitan Statistical Area (C/MSA) serve as the presumptive boundary for 8-hour NAAQS nonattainment areas.[4] We believe this approach will best ensure public health protection from the adverse effects of ozone pollution caused by population density, traffic and commuting patterns, commercial development, and area growth. In the past, areas within C/MSAs have generally experienced higher levels of ozone concentrations and ozone precursor emissions than areas not in C/MSAs. In addition, the 1990 Amendments to the CAA established the C/MSA as the presumptive boundary for ozone nonattainment areas classified as serious, severe and extreme.

4. How should designation recommendations, including boundaries, be addressed when more than one State and/or Tribe might be affected?

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[3]For the 8-hour ozone NAAQS, it is 3 consecutive years of data in accordance with 40 CFR part 50, Appendix I; data used will be quality-assured and meet 40 CFR part 58 requirements (e.g., for monitor siting). Designations should generally be made based on 1997-1999 air quality, considering data availability.

[4]C/MSAs are identified by the U.S. Bureau of the Census and can be found at the following website: http://www.census.gov/population/www/estimates/aboutmetro.html.

Where more than one State is involved with respect to an area, close coordination is needed among the affected States and Tribes prior to the time the recommendation is made. In addition, the EPA Regional Office should coordinate where an area may be located in States or tribal lands located in two or more regions. There is a strong presumption that interstate areas making up one C/MSA will be designated as one nonattainment area. The EPA believes that it is important that consistent and coordinated boundary recommendations be made for the area from each State and Tribe.

5. What factors should a State or Tribe consider in determining whether to recommend area boundaries that are larger or smaller than a C/MSA or tribal land?

In some cases, the most appropriate nonattainment area boundary may be larger than the C/MSA. For example, if sources located in a county or on Indian lands outside the C/MSA contribute to violations within the C/MSA, States or Tribes should consider whether it would be appropriate to expand the nonattainment area to include the area in which those sources are located. In other cases, a smaller nonattainment area may be more appropriate. For example, one C/MSA may cover multiple air basins, or include counties or portions of counties which are rural in nature.

A State or Tribe wishing to propose larger or smaller nonattainment area boundaries (including partial counties or portions of areas on tribal lands) than those matching the C/MSA or boundary of the tribal land should address how each of the following factors affect the drawing of nonattainment area boundaries and how the resulting recommendation is consistent with the definition of nonattainment in §107(d)(1) of the Act. Additional information is provided below under question number 12 on documentation.

- Emissions and air quality in adjacent areas (including adjacent C/MSAs)
- Population density and degree of urbanization including commercial development (significant difference from surrounding areas)
- Monitoring data representing ozone concentrations in local areas and larger areas (urban or regional scale)
- Location of emission sources (emission sources and nearby receptors should generally be included in the same nonattainment area)
- Traffic and commuting patterns
- Expected growth (including extent, pattern and rate of growth)
- Meteorology (weather/transport patterns)
- Geography/topography (mountain ranges or other air basin boundaries)
- Jurisdictional boundaries (e.g., counties, air districts, existing 1-hour nonattainment areas, Reservations, etc.)
- Level of control of emission sources
- Regional emission reductions (e.g., NOx SIP call or other enforceable regional strategies)

A State or Tribe choosing to propose area boundaries smaller than a C/MSA or tribal land should consult with its EPA Regional Office. The EPA will consider alternative boundary recommendations on a case-by-case basis to assess whether the recommendation is consistent with §107(d)(1) of the Act.

The EPA will issue guidance on factors for Tribes to consider when submitting designation recommendations. Some of the factors, particularly for areas throughout Indian country that may not have adequate or any air quality ozone monitors, are geographic location of the land, proximity to the nearest C/MSA, prevailing meteorology, location of nearby ozone monitors, available ozone air quality data, and location of nearby emission sources both inside and outside of such areas.

6. What are the key timing activities for and implications of designation as nonattainment under the 8-hour ozone standard particularly for States?

The designation process has several steps. On June 25, 1999, EPA issued a guidance memorandum requesting that States submit the most recent, complete, quality-assured ozone monitoring data identifying the monitors where exceedances of the 8-hour standard have occurred. The EPA, with this memorandum, is providing guidance describing the criteria for drawing boundaries for nonattainment areas and setting deadlines for the steps in the designation process. States will then have several months to work with local governments and other stakeholders and submit their recommendations and supporting documentation to EPA for area designations and boundaries by June 30, 2000. The EPA will then review and respond to the State designations including boundaries by late summer. The EPA will not make final designations prior to late December because it cannot make them until at least 4 months (120 days) after responding to the States, pursuant to a CAA requirement. Given this process, designations could not become effective prior to early 2001 at the earliest, nor would conformity or other requirements. Conformity and other planning requirements would be triggered on the effective date of designations. The EPA Regional Offices should immediately begin to work with their States and Tribes on boundary recommendations to ensure that they have maximum input prior to the June 30, 2000 recommendation date and encourage States to coordinate with appropriate transportation planning agencies.

After EPA makes the final designations, it will publish them in the Federal Register and set a date on which they become effective. Historically, the effective date of a rule is usually 30 to 60 days after publication, but can be later. In the process of determining when to finalize the proposed designations and make them effective, EPA will carefully consider the time needed to prepare for any applicable requirements, as well as the status of ongoing litigation and administrative proceedings. The EPA is committed to ensuring that all State and local officials have ample time to comply with requirements that are applicable when designations become effective.

The EPA believes that the Court decision affirms the serious health risk posed by ozone. Thus, notwithstanding the schedule described above, EPA believes that it is important to issue a final action on designations to provide the public with information regarding the air quality in areas in which they live and work. In addition, areas can continue to take certain actions with respect to the 8-hour standard, such as operating monitoring sites, analyzing monitoring data, implementing public education and communications efforts regarding health impacts and potential solutions, collecting emissions inventory data, examining potential control measures such as major source Reasonably Available Control Technology and other Reasonably Available Control Measures, considering voluntary emission reduction measures and considering the integration of strategies for the attainment and maintenance of all NAAQS.

7. How should long-range transport be addressed in the boundary recommendation?

In addition to nearby areas with sources contributing to nonattainment, ozone concentrations are affected by long-range transport of ozone and its precursors (notably NOx). Thus, in certain parts of the country, such as the eastern U.S., ozone is a widespread problem. Where this is the case, the Act does not require that all contributing areas be designated nonattainment, only the nearby areas. Regional strategies, such as those employed in the Ozone Transport Region in the Northeast U.S., and in the EPA NOx SIP call, are needed to address the long-range transport component of ozone nonattainment, while the local component must be addressed through more local planning in and around the designated nonattainment area. Tribal areas may also be affected by transport.[5]

8. How should designation recommendations be handled for 8-hour ozone nonattainment areas that cover some of the same area as 1-hour ozone nonattainment areas?

In areas where the 1-hour NAAQS still applies, EPA's presumption is that the designated 8-hour nonattainment area boundary will be the C/MSA or the 1-hour nonattainment area boundary, whichever is larger.

9. What will happen if EPA does not receive a designation recommendation from a State or Tribe?

In the absence of a Governor's recommendation by June 30, 2000, EPA will determine the designation. The EPA plans to follow this guidance in designating areas. In cases where Tribes do not make their own recommendations, then EPA, upon consultation with the respective Tribe(s), will promulgate the designation it deems appropriate.

10. Must States recommend a classification for, or will EPA classify, nonattainment areas under the 8-hour ozone NAAQS?

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[5]The prohibitions and authority contained in sections 110(a)(2)(D)(i) and 126 of the Act apply to Tribes in the same manner as States.

The EPA will not classify nonattainment areas at this time; thus, States and Tribes should not submit recommendations for classifications. If EPA determines to classify areas in the future, it will provide an opportunity for State and Tribal involvement.

11. What technical information should a State consider in its designation recommendations?

To assist States and Tribes with their recommendations, the EPA is providing technical reports and maps showing locations where air quality was violating the 8-hour NAAQS based on 1997-1999 monitored data that States and Tribes may find useful in defining the boundaries of nonattainment areas. The information will be posted on EPA's web site in the immediate future.

12. What documentation should a State or Tribal government submit concerning the nonattainment area recommendations?

In addition to technical information documenting the recommendation for area boundaries noted in question number 5 above, the EPA is requesting that each State or Tribe in its submission provide certain air quality data and geographic information to support its nonattainment area recommendation. The EPA is asking for the following information:

For nonattainment areas:

a. Design value[6] for the area.
b. Period of time represented by the design value, e.g., 1997-1999.
c. Design value monitoring site location and identification number.

For attainment/unclassifiable and nonattainment areas:

d. Names of counties and tribal lands included, and
e. If partial counties or portions of tribal lands are included, the boundary definition/description as outlined below.

If the recommended nonattainment area boundary is less than a C/MSA, the State or Tribe should document its rationale for selecting the nonattainment area boundary. The documentation should address how the items in question number 5 affect the drawing of boundaries for each county or Reservation not included in the recommended nonattainment area such as population, traffic and commuting patterns, commercial development, projected growth, prevailing meteorology, nearby sources and air quality, and any other relevant or technical justification factors. In particular, where the recommended area boundary consists of parts of counties, C/MSAs, or Reservations, the State or Tribe must provide a technical analysis for its recommendation, explaining how the boundary is consistent with §107 (d)(1) of the Act.

If there is less than a full county or Reservation, the EPA is requesting a legal definition of the area, a detailed hard copy map, and, because EPA plans to map the definition, a digitized

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[6]The ozone air quality design value for a site is defined as the 3-year average annual fourth-highest daily maximum 8-hour average ozone concentration.

latitude and longitude description for mapping purposes if available. Regional Offices and States should include the names of contacts from their respective offices for this information. The EPA requests that each State and Tribe submit its attainment/unclassifiable and nonattainment area designation recommendation and boundary information to EPA in both a detailed written form and in electronic form in a format consistent with how designations are identified in Part 81 of the CFR. In addition to the formal letter making the recommendation, EPA requests the States provide an electronic record in a usable file which will be merged with all other States' and Tribes' recommendations for a final complete product. An example is shown below.

Format of Recommendations for Designations

State Name
Nonattainment Areas:
    Area Name
        County or Tribal Land Names
    Area Name
        County or Tribal Land Names
Attainment/Unclassifiable Areas:
    Rest of State or County or Tribal Land Names

This is how it would appear in the Code of Federal Regulations:

81.xxx [STATE NAME].

* * * * *

[STATE NAME]-OZONE (8-HOUR STANDARD)

Designated Area	Designation Type	Classification Type
[NAME] Area: [NAME] County..... [NAME] Area: [NAME] County..... [NAME] County..... [NAME] County..... [NAME] County..... [Name] Tribal Land [Name] County..... Rest of State..... Rest of Tribal Land.....	 Nonattainment Nonattainment Attainment/ Unclassifiable Attainment/ Unclassifiable	 LEAVE BLANK

* * * * *

13. When should the recommendations be submitted?

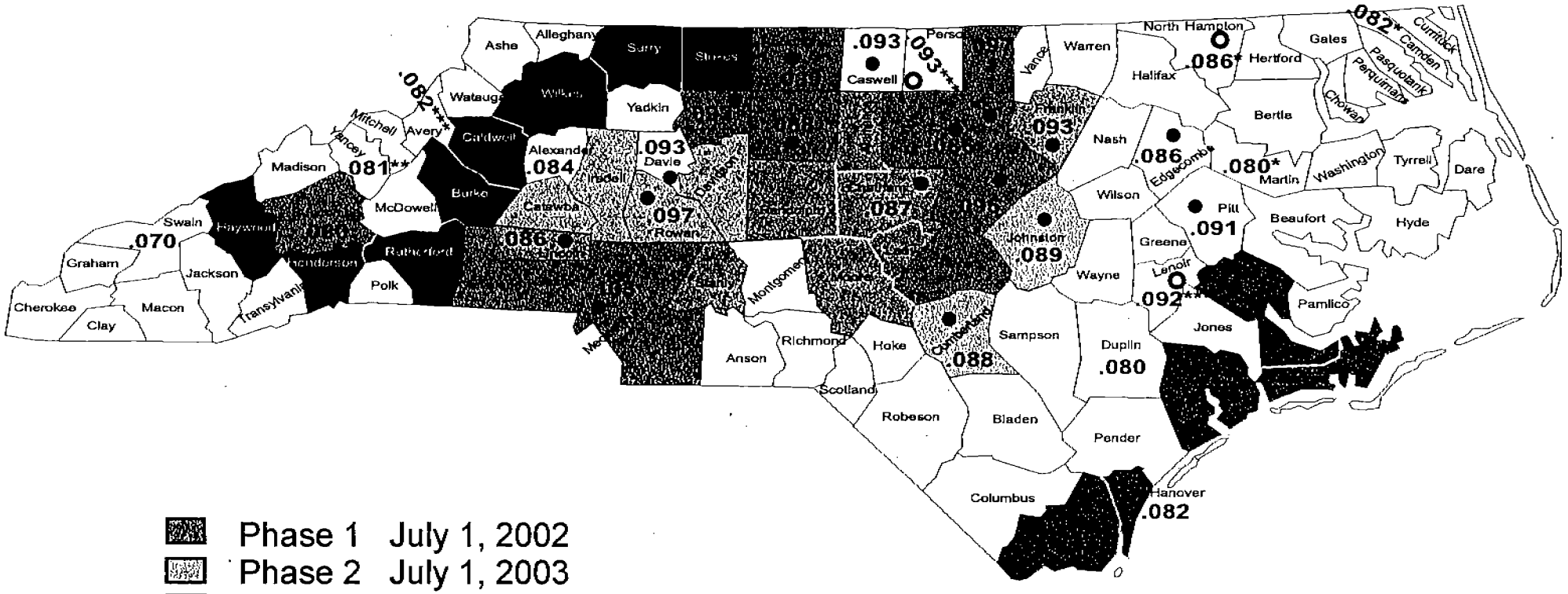
The Governor should submit all recommendations and supporting documentation for designations for nonattainment and attainment/unclassifiable areas, boundaries, and boundary descriptions described above to the EPA Regional Office by June 30, 2000. The eligible Tribal governing body, with the assistance of the appropriate EPA Regional Office, should submit all recommendations and supporting documentation consistent with the statements in question

number 2 of this memorandum. The EPA will notify the State or Tribe no later than 120 days prior to the designation action where EPA plans to modify a recommendation.

14. Is there any special process for attainment/unclassifiable areas?

The EPA will not distinguish between attainment and unclassifiable areas. The State or Tribe should indicate if its preference is that EPA list each attainment/unclassifiable area individually (e.g., by county); otherwise, EPA will indicate that the "rest of State" or "rest of tribal land" is attainment/unclassifiable.

I/M County Phase-In



- Phase 1 July 1, 2002
- Phase 2 July 1, 2003
- Phase 3 January 1, 2004
- Phase 4 July 1, 2004
- Phase 5 January 1, 2005
- Phase 6 July 1, 2005
- Phase 7 January 1, 2006

Not To Scale
06/29/99

APPENDIX A

Backward Trajectories

Backward Trajectories for Attainment Investigations

- Because of the 4-dimensional nature of the transport of an air parcel by the wind in the lower atmosphere, a 2-dimensional (x-y) array displaying the wind field to determine the origin or source of a parcel is insufficient. To more accurately assess the source area of an air sample, both the spatial (x, y, z) and time components of the parcel's transport must be considered. Trajectories incorporate both the spatial and time changing characteristics of a parcel's movement.

- Backward trajectories (or back trajectories) begin at a known end point and are run backwards in time to determine the origin of the parcel which is at the desired end point. The time length of the backwards tracking can vary according to one's interest, and the initial source or origin of the parcel is, of course, linked to the length of time the parcel is tracked backwards.

- For NC DAQ's attainment investigations, parcels were investigated for various areas of non-attainment. Trajectories were run backwards for these areas to assess the path the parcel -- which was sampled at the monitors in the areas of concern -- took in arriving at the monitored end point. We used the NOAA Air Resources Laboratory's (ARL) on-line trajectory capability.

- Trajectories are run from ARL's HYSPLIT program (http://www.arl.noaa.gov/ready/hysplit4.html) using the eta archived data (EDAS). Where the EDAS is incomplete and the model can't run, if available, we used the next best resolution data base available (NGM is available 1991 - April 1997 and preferable; otherwise, the "FNL" data base).

- Trajectories are all run with the terminal point at the lat/long of the point of interest. For example, Taylorsville is run with its lat/long.
- Heights are 10m (1000mb), 300m (950mb), and 1000m (900mb).
- Duration is 24 hours for Cumberland County and points west; 36 hours for sites in eastern N.C.
- All (with one exception, see below) are set with the end time as 2000Z (1600EDT) on the day of the exceedance at the receptor location.
    - Exception -- Mountain locations are run with two end times for each exceedance day.
        - The first end time is the same as all others, above, 2000Z.
        - The second end time is the following Zulu day at 0300Z, which is 2300L on the original calendar day. For example an exceedance day of Jun 10th would have one end time at 10/2000Z (10/1600L) and the other at 11/0300Z (10/2300L).
        - These two times are designated A & B, respectively.

Ozone Exceedance Day Back Trajectories

Monitor Site	Monitor ID	Lat°N	Long°W	Elevation (ft MSL)
Barnet Knob	370990005	35.52	83.24	4701
Bent Creek	370210030	35.5	82.6	2215
Bryson City	371730002	35.43	83.44	1837
Frying Pan	370870035	35.38	83.08	5200
Mt Mitchell	371990003	35.74	82.79	6503
Purchase Knob	370870036	35.59	83.08	4902
Waynesville	370870004	35.30	82.91	2641

Back Trajectory Model: HYSPLIT4
Archived Meteorological Dataset: EDAS
Vertical Motion Scheme: Model Vertical Velocity (Omega)
Back Trajectory Duration: 24 hours
Trajectory End Time: 20:00 UTC (16:00 EDT) &
D+1/03:00 UTC (D/2300 EDT)
Trajectory Heights: 1000 meters AGL
300 meters AGL
10 meters AGL

Back Trajectories calculated to center of mass: ***35.5°N 83.0°W***

Total 1997 8-Hour Ozone Exceedance Days: **8**
1997 Ozone Exceedance Dates:
May -- 23
June --
July -- 13, 14, 17, 18, 19
August -- 3, 4
September --

Total 1998 8-Hour Ozone Exceedance Days: **7**
1998 Ozone Exceedance Dates:
May -- 15, 16, 17, 18, 19*, 20*
June --
July --
August -- 6
September --

Total 1999 8-Hour Ozone Exceedance Days: **33**
1999 Ozone Exceedance Dates:
May -- 4, 10, 11, 28, 29
June -- 8, 9, 10
July -- 16, 17, 23, 24, 26, 27
August -- 4, 5, 7, 17, 18, 19, 20, 22, 28
September -- 1, 2, 4, 7, 8, 11, 12, 13, 24, 25

* Missing Meteorological Data: No trajectory available

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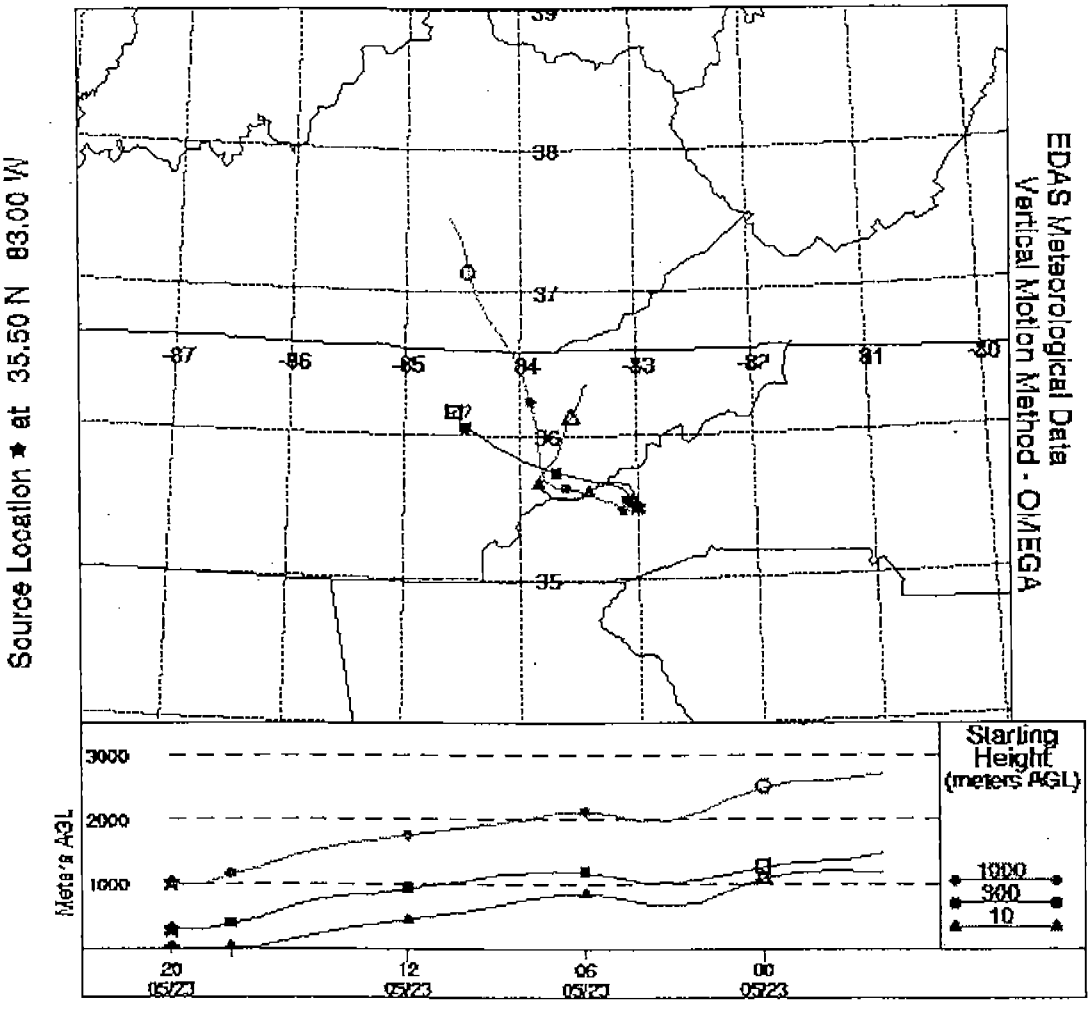
NOAA AIR RESOURCES LABORATORY

Backward Trajectories Ending- 20 UTC 23 MAY 97



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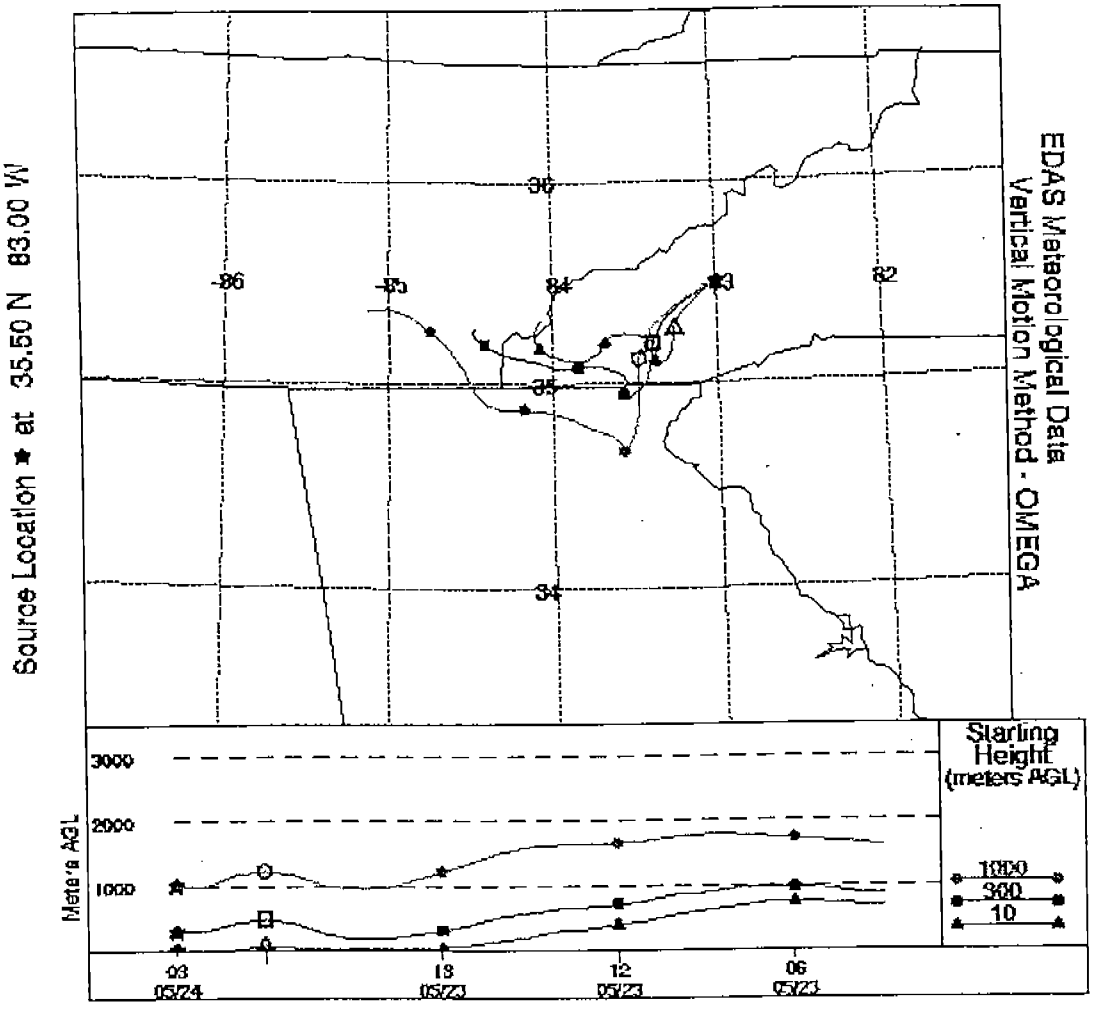

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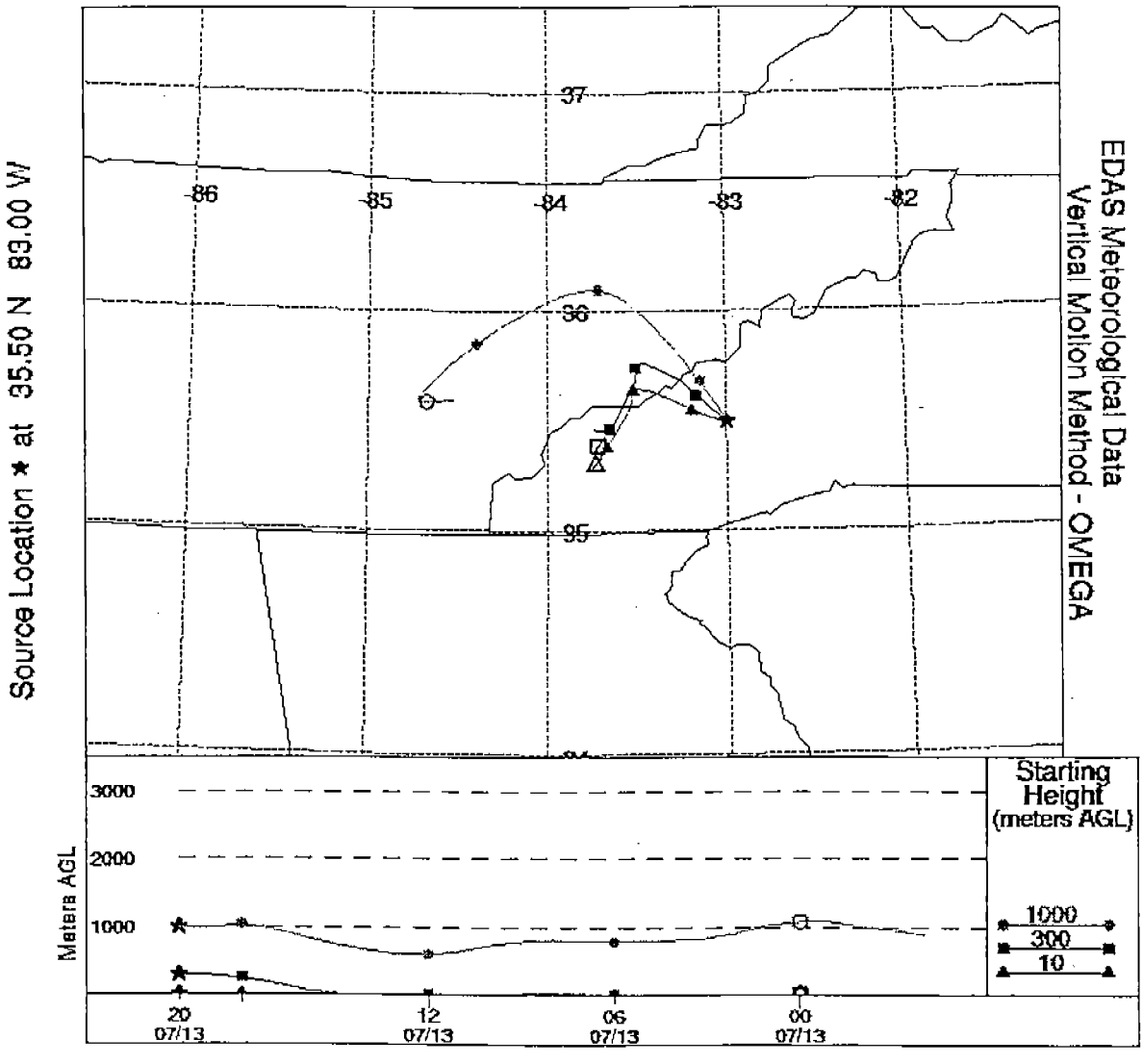

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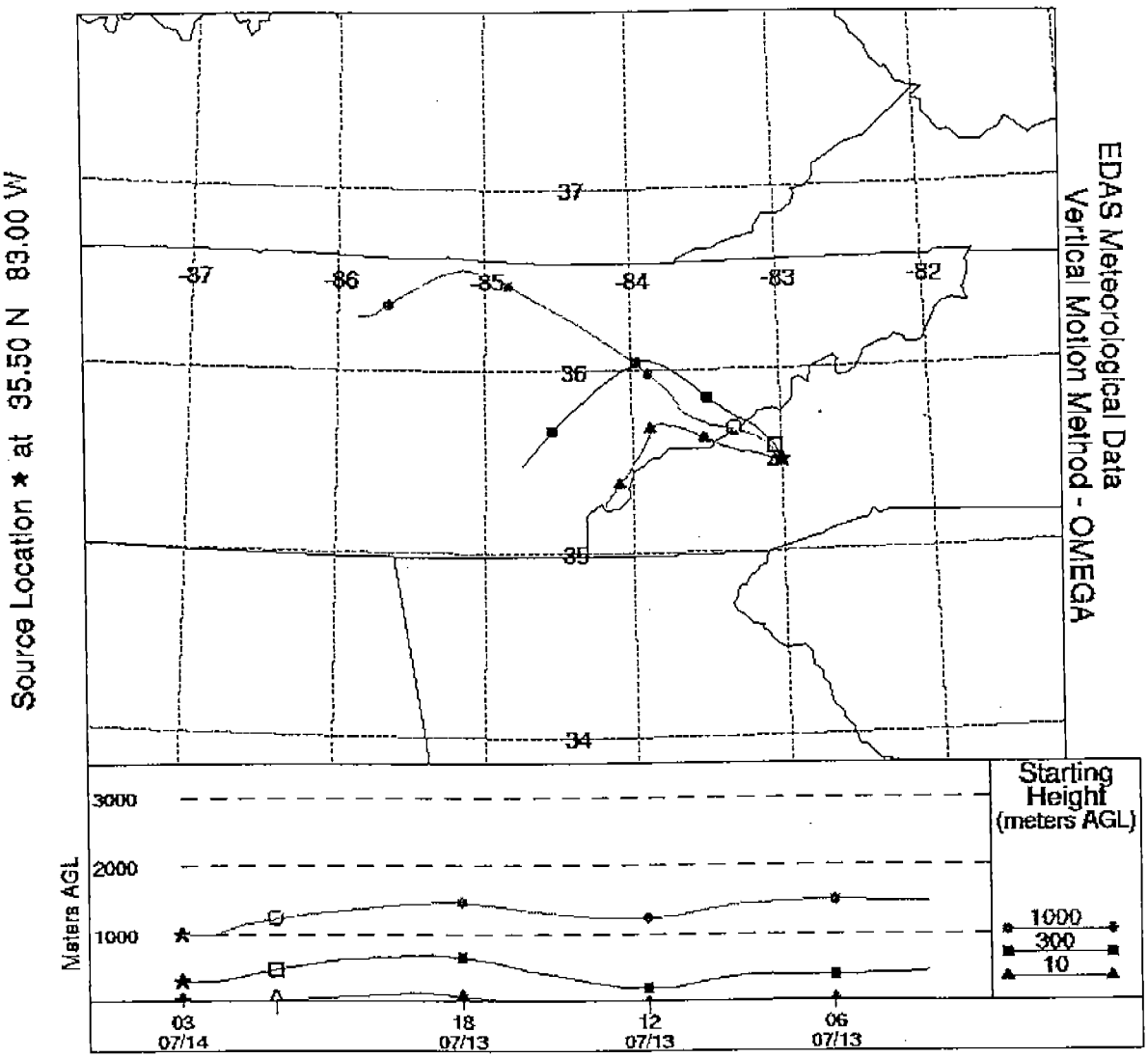

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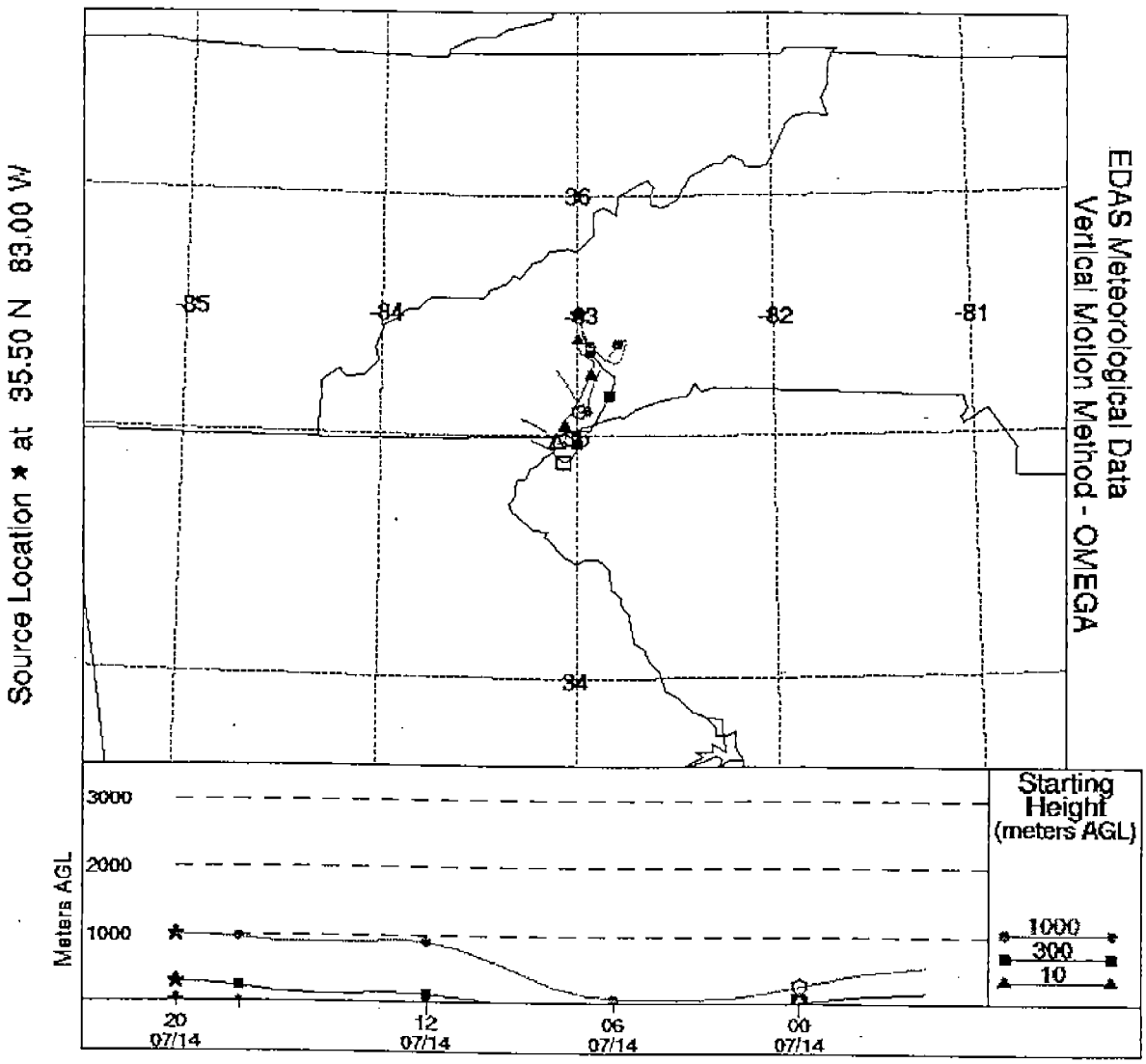

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